Lost Johnny Avalanche
Monday, February 20, 2012
Incident Report

April 10, 2012

Location: (See Appendix A-1 – Maps)

Hungry Horse Ranger District
Flathead National Forest - Region One
Flathead County, Montana

Lost Johnny Creek, Northern Swan Range
Elev. 5300 ft., below treeline
Lat. 48°14'31.87" N
Long. 114°00'17.09" W
WGS84 datum

Report Author:

Stan Bones, Flathead National Forest
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Summary:

- 1 Male Snowmobiler, Caught, Completely Buried, Killed
  Charles (Chuck) John Dundon III, age, 33, Connell, Washington
- 1 Male Snowmobiler, Caught, Partly Buried Not-critical
- 2 Snowmobiles, slightly damaged

Weather: (See Appendix A-2- Weather)

This winter the northern portion of the Swan Range in NW Montana has been enduring a snow drought. Air temperatures have been generally warmer than average, although four episodes of cold Canadian air did occur. Winds have generally been at, or slightly above average. In contrast to the normal west - southwest wind pattern, this season the area experienced more wind from the northwest.

Initially October's precipitation was well above average, however warm temperatures dictated that moisture was in the form of rain and not snow. It wasn't until early November that air temperatures cooled and snowfall began to accumulate. The rate of snowfall for the month of November approximated normal, but the first half of December was a flat line. By the 15th of December, the Noisy Basin Snotel (located 6.5 air miles south-southeast of the Lost Johnny avalanche site) was only registering 5.5-inches of snow water equivalent (SWE) versus the normal 15.0-inches, only 37% of average. January and February saw an increase in snowfall. By the day of the Lost Johnny avalanche, Noisy Basin Snotel was registering 22.1-inches of SWE, 70% of normal.

In early February a high pressure system lingered over Northwest Montana. This dry stable air mass produced mostly clear skies with variable valley clouds and fog from the 3rd of the month to the 6th. As temperature inversion conditions developed, surface hoar formed at many mountain locations.

Between February 8th and 16th the Noisy Basin Snotel recorded receiving 1.8-inches of snow water equivalent. This snowfall for the most part was spread rather evenly over the eight days. Then over the 48-hours from noon on Thursday, 2-16-12, to noon, Saturday, 2-18-12, the snotel recorded 0.9-inches of SWE as fast moving storm cells raked across the region. Between the beginning of Sunday morning, 2-19-12 and the time of the Lost Johnny avalanche late Monday afternoon (reportedly 4:30 PM, MST), Noisy Basin Snotel recorded another 1.8-inches of SWE. The surface hoar layer that formed earlier in the month was now buried approx. three feet.

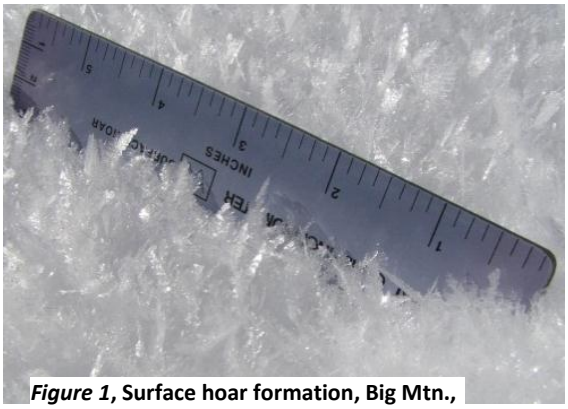


***Figure 1*, Surface hoar formation, Big Mtn., Whitefish Mountain Resort, 2-4-12**

Avalanche Condition (See Appendix A-3 Avalanche Advisory)

The Lost Johnny area is within the US Forest Service Northwest Montana Backcountry Avalanche Advisory area. Three days before the incident, Flathead National Forest issued its regular Friday backcountry avalanche advisory rating the avalanche danger as *moderate* between the elevations of 5,500 and 7,500 feet on all mountain ranges. Of special concern were:

- Steep, open slopes and gullies lacking vegetative and terrain anchors, particularly slopes with a relatively thin snow cover and a basal layer of weakly bonded, eroding, faceted grains
- Unstable near-surface snow poorly bonded to buried surface hoar or layers of melt-freeze ice.

Backcountry travelers were advised at that time that natural avalanches were unlikely, while human triggered avalanches were possible. The size and distribution of avalanches ranged from small in specific areas to large in isolated areas.

The caution emphasis was that the avalanche danger was expected to gradually increase from that time through the weekend with the forecasted new snow. Backcountry travelers were advised to be particularly alert to new snow loading from precipitation and/or wind upon the existing buried weak surface hoar and melt-freeze ice layers. They were advised to:

- Always carry and know how to use avalanche safety equipment
- Watch for a possible rapid change in weather conditions beyond forecasted amounts
- Check out the site specific snow stability before jumping in or on

Snowmobile Group Information: (See Appendix A-1 Maps)

The party was two snowmobilers from south-central Washington on their first snowmobiling visit to Montana. Their group had only arrived that afternoon in the area. They had heard of the Lost Johnny area. Their intent was to make a quick 45-minute ride up the road and return in time for

spaghetti dinner. They left the parking lot and trailhead at the Hungry Horse Dam at a time that most everyone else was packing up and going home.

At the end of the Lost Johnny Road, NFSR #895B, they crossed Lost Johnny Creek on a snow bridge at the site of the removed log bridge. After riding a short distance on the south side of the creek, they turned around and retraced their path. Recrossing the snow bridge at the creek, they were just in time to encounter a party of local snowmobilers descending the steep access trail on the north side of the creek. This trail called Gas Hill provides access to the area referred to as Pinball Alley, the slopes beneath Hash Mtn, and the area around Lamoose Lake. The Washington riders asked if this was the area they should ride tomorrow. The locals described the terrain and after a short exchange, departed down the road toward the trailhead.

The Washington riders discussed climbing Gas Hill, but after considering the time, decided to also head back down the trail. The snow was great and they both were anxious and excited, anticipating the next day.

Approximately 0.25 miles down the road, the two men were riding side-by-side. Chuck Dundon was on the inside, near the ditch, while the other rider was on the outside, near the road fill shoulder. At this point the road passes beneath a steeper slope with some exposed rock, then the slope above the road flattens in an area where the evergreens and alder/maples are widely spaced and the road cut-slope practically disappears. It's an area with an opening leading off of the road, an easy arcing sidehill section in the middle, and an equally easy open return to the road on the far end. Dundon decided to take this lead.

As they rode, the companion watched his friend depart from the road. Within the blink of an eye he saw fast moving snow descending the slope above them. The companion reported that he had no time to react. Before he could hardly shift his gaze from the moving snow upslope to look ahead, searching for an escape opening, he was hit from the left by the avalanche. He tumbled with his snowmobile initially and fought to stay on top of the flow by swimming. He said he swam, and swam, and swam! Then suddenly he came to a stop and could see his hand in front of this face. He could hear his machine idling somewhere further down slope. His thoughts immediately turned to Dundon. He knew Chuck's position in that last second prior to the avalanche's impact. He knew Dundon was upslope only 20-25 feet from a group of three or so trees nearly at the road's edge.

After freeing himself the companion said that he struggled as quickly as he could back up to the road and to the group of trees where he had last seen Dundon. He frantically dug there. He searched all around the trees and could find nothing of his friend or his snowmobile. Dundon was wearing an avalanche beacon, but the companion was not. The ride was supposed to be a very quick trip up the road just to check the area. The companion said that he didn't bring anything except a cell phone and what he was wearing. He didn't even carry cigarettes.

When digging above the largest tree of the group, the companion suddenly realized the bark was seriously scarred, having been impacted, probably by Dundon's thrown snowmobile. Seeing this and imagining that Chuck also had likely impacted the tree, he immediately felt that his friend was most likely deceased. He checked his cellphone, but could not find a reception signal. Fearing for his own safety, his attention then turned to getting safely back to the trailhead to alert authorities.

The companion worked his way down slope to his snowmobile. After some time and effort he succeeded in freeing it. Being now alone and with the deep new snow, he felt he needed to stay on the avalanche debris to maneuver his way back to the road. He couldn't afford getting mired

downslope in the soft new snow. Eventually after much effort he regained the road. He felt it important to mark the location on the road so if he did make it out to alert authorities, he and a search and rescue party would recognize the site. He backed his machine into the cut bank slope of the road and accelerating several times, cutting a sizeable divot into the bank. Zeroing his trip meter he would also measure the distance back to the junction with the Westside Road, NFSR #895.

When he left the avalanche site it was pitch dark. His way was lit only by the machine's headlight and he said that he felt exceedingly vulnerable. Almost immediately he encountered more avalanche debris on the road. An adjoining slope had sympathetically or subsequently also slid. Now he was even more nervous and questioning if he would survive the ride out. He said he was set on trying, even if it meant death. He slowly, and as lightly as he could maneuver, crossed this and other sections of avalanche debris. He was afraid that if he hit anything with force, he would surely trigger another avalanche onto himself.

Eventually he reached the intersection of the Lost Johnny and Westside Roads. He checked his trip meter. It read exactly 5.0 miles from the avalanche site. He quickly rode on to the trailhead and parking lot. When leaving the trailhead he and Dundon had left the ramp down on their pickup snowmobile bed rack. After hurriedly loading his machine, he checked his cell phone again and discovered it still had no signal. Hastily he drove to Hungry Horse. The brightest lights were at the Dam Town Tavern. He rushed there, entered and asked if he could use their phone. He called 911. After that point he said everything became a hazy blur.

Avalanche Characteristics:

Tony Willits, Joy Sather, and Stan Bones, Flathead National Forest, visited the scene at approx. 1000 hours, Tuesday, February 21, the day following the avalanche release. They accompanied Forest Service law enforcement officers who retrieved the fatal victim's entrapped snowmobile and returned it to the remaining members of the Washington snowmobile group at Hungry Horse Dam trailhead parking lot.

On the snowmobile ride to the avalanche site, they observed where several slab avalanches had recently released in the Lost Johnny Creek drainage and even rode over a couple of debris piles where slides had reached the road.

- *Avalanche type*, SS, soft slab avalanche
- *Avalanche trigger*, AMu, unintentionally triggered by snowmobile and rider
- *Destructive force*, D2, could bury, injure, or kill a person
- *Size relative to the path*, R4, large
- *Sliding surface*, old snow layer
- *Distance from trigger to crown face,* approx. 370 ft. horizontal, 445 ft. slope distance, (map measured)

- *Height of crown face, (observed)*
    - Minimum, 50 cm (≈20 inches)
    - Average, 80 cm (≈32 inches)
    - Maximum, 100 cm (≈40 inches)
    - Measured, 90 cm (≈36 inches)

- *Width (map measured)*
    - Minimum and typical, 160 ft.
    - Maximum, 250 ft.
- *Vertical Fall,* 340 ft., (map measured)

- *Slab snow,* F fist,4F four finger,1F one finger hardness, (observed)
- *Weak layer,* Buried surface hoar, 2-4 mm size, F hardness, 5 mm thick layer, (observed)
- *Bed surface,* O, released within the old snow,1F one finger harness, (observed)

- *Elevation at highest portion of the crown fracture,* approx. 5,590 ft., (map measured)
- *Average slope angle at the highest portion of the crown,* 38-degrees (map measured)
- *Central aspect of the avalanche,* S52E (ESE) (map measured)
- *Ground cover at start zone,* grass
- *Location of crown face,* mid-slope (observed)
- *Snow moisture,* D, dry (observed)

- *Track,* open slope with very widely spaced trees(observed)

- *Elevation at toe of the runout,* approx. 5,250 ft. (map measured)
- *Debris type,* fine, hard (observed)
- *Total crown to toe slope distance,* approx. 680 ft. (map measured)
- *Total crown to toe horizontal length of slide,* approx. 590 ft. (map measured)
- *Alpha angle individual*, approx. 29.7-degrees (calculated)

- *Avalanche reportedly released* at approx. 1630 hours, MST, Monday, February 20, 2012

When found and uncovered the victim's body was mostly in an upright position, halfway twisted at the waist, looking downslope. His snowmobile was completely buried 3-4 feet, pointed toward the slope and almost level, but entirely upside down. When uncovered the underside of the machine and the exposed track pointed skyward with the seat and handlebars hidden underneath. The victim's legs were somewhat extended beneath the upside down machine, the right in front of the windshield, the left behind the handlebars.

After being impacted by the avalanche, the victim and his machine had travelled downslope probably less than 40 feet, colliding with and spinning off a clump of three small trees (6-8 inch diameter or less). The victim and snowmobile's final position was immediately below the lowest of the leaning trees. This was likely at the location of the road ditch. The victim's head was approximately 3 feet beneath the surface of the snow. Both his helmet and backpack had been pulled off by force.

Emergency Response:

Once the call was received Flathead County Dispatch paged North Valley Search and Rescue and the US Forest Service. These joined Flathead County Sheriff's personnel to form a small team that snowmobiled to the site that night. At the scene they quickly detected a signal from the victim's avalanche transceiver and retrieved the body. Because of the late hour and continuing snowfall and poor visibility, they left the upturned and inextricably mired snowmobile for recovery by the Forest Service the next morning.

Lessons Learned / Reaffirmed:

Avalanche incidents are always tragic events that often have a human cause. Nature frequently provides obvious clues and signals, warning us when conditions are hazardous. It is imperative that we take the time to learn and interrupt the warning signs. Seldom do situations unfold as swiftly, brutally, and unforgiving as the Lost Johnny avalanche. These riders were focused on riding the road, not straying afield onto steep slopes. But even travel in very close proximity to a road cannot guarantee safety.

Their biggest problem was not recognizing what constitutes avalanche terrain and not realizing the presence and appreciating the fatal nature of buried surface hoar. Being from out of the area they obviously faced a challenge in understanding past snow and weather conditions.

- *Realize that in a mountainous environment, avalanches are always a serious threat*. People need to understand that anytime they are travelling in mountain terrain they potentially face a life threatening avalanche risk. Recognize that the risk can be managed and reduced however, even possibly eliminated, by becoming avalanche safety trained and making wise conscious decisions. Being avalanche safe doesn't require giving up the activity that draws us to the mountains. But it does require us to be responsible and undertake efforts to manage the risk we face. For our lives and wellbeing we owe the effort to ourselves and our loved ones.

- *Buried surface hoar layers **always** demand respect*. These layers pose the greatest avalanche risk to be found in Western Montana. They are killers, accounting for the vast majority of avalanche deaths in the region. The conditions under which they form are often obvious, not obscure and hidden. With minimal effort one can easily track these weak layers as they become buried within the snowpack where they can persist for long periods of time.

  Buried surface hoar should always be taken very seriously. A steep slope with a significant layer of buried surface hoar is like a loaded rifle with a hair trigger and the safety catch off. It can be an awesome and swift killer. It is also important to realize that buried surface hoar avalanches can be remotely triggered from flatter nearby terrain. A collapse of these fragile and persisting crystals at one point can send an outwardly radiating shock wave within the layer, sometimes sympathetically releasing avalanches hundreds of feet away on adjoining and/or adjacent slopes.

- *As much as possible be prepared for and anticipate the unexpected*. One should never plan for just a casual experience in the backcountry, especially in winter. At best these are semi-wilderness endeavors, not "walks in the park." When leaving the trailhead, people need to be prepared mentally and physically and equipped to deal with whatever situation they may encounter. An experience can, in the blink of an eye, turn from the expectant casual into a struggle between life and death.

  All three fatal avalanches occurring in NW Montana this season involved some equipment shortfall. Earlier decisions were made and expectations were imagined that later proved inadequate. Vital pieces of safety equipment (cell phones, transceivers, or shovels) were left behind. Having this equipment may not have altered the final outcome in these instances, but because the items were absent, one will never know for certain. As much as possible, always plan and prepare for the worst. Realize also that only a small shift of a single situational dynamic can produce an entirely different event, requiring a completely different response. We should always be asking ourselves, "Am I prepared?"

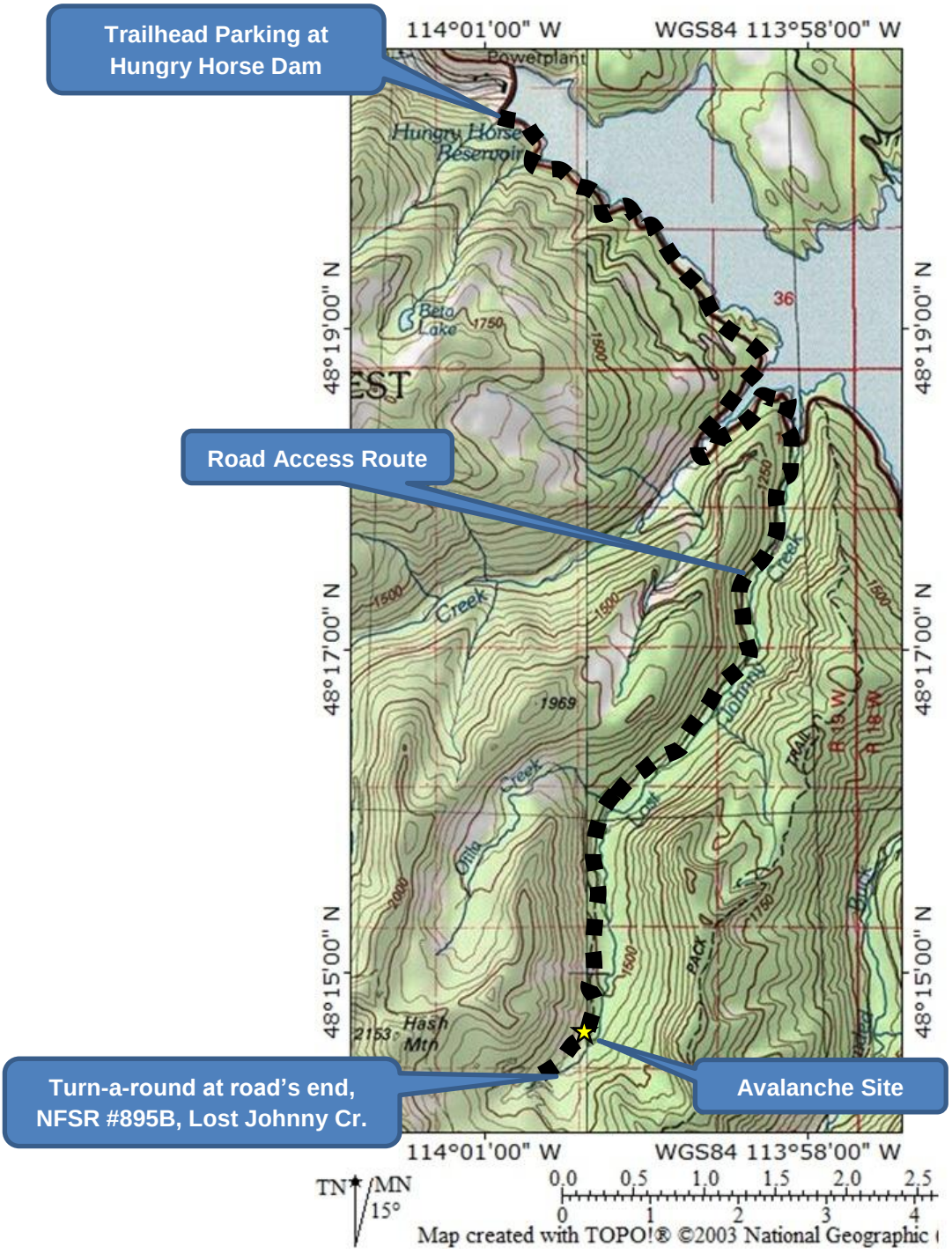
- *Expose only one person to a potential hazard at a time*. Strive to anticipate all potential hazards, recognizing that one will likely never be 100% successful. Knowing that whatever befalls one in a closely grouped party will likely befall the others, always provide some separation between group members. Remain within sight, ready to react. Realize also that each additional person on a slope at the same time multiplies the stress.

Appreciation:

We very much appreciate the assistance of Chuck Dudon's close friend and riding companion, Flathead County Sheriff's Office, and Forest Service Law Enforcement who shared with us information that make this report possible. We hold everyone involved in this incident and especially Chuck's family and friends in our prayers during this difficult time of loss.

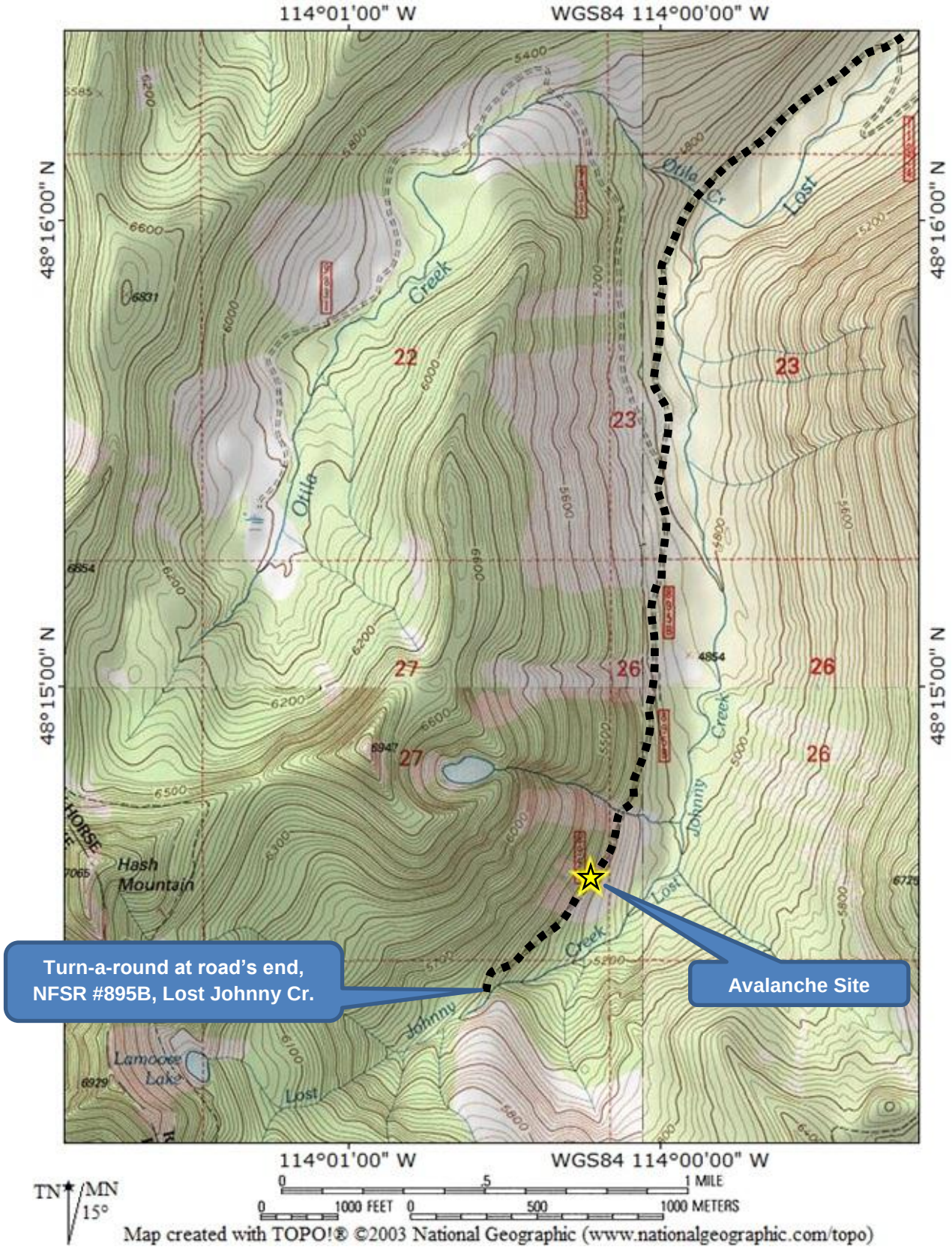
Stan Bones, Flathead National Forest
April 10, 2012

Appendix A-1 Maps

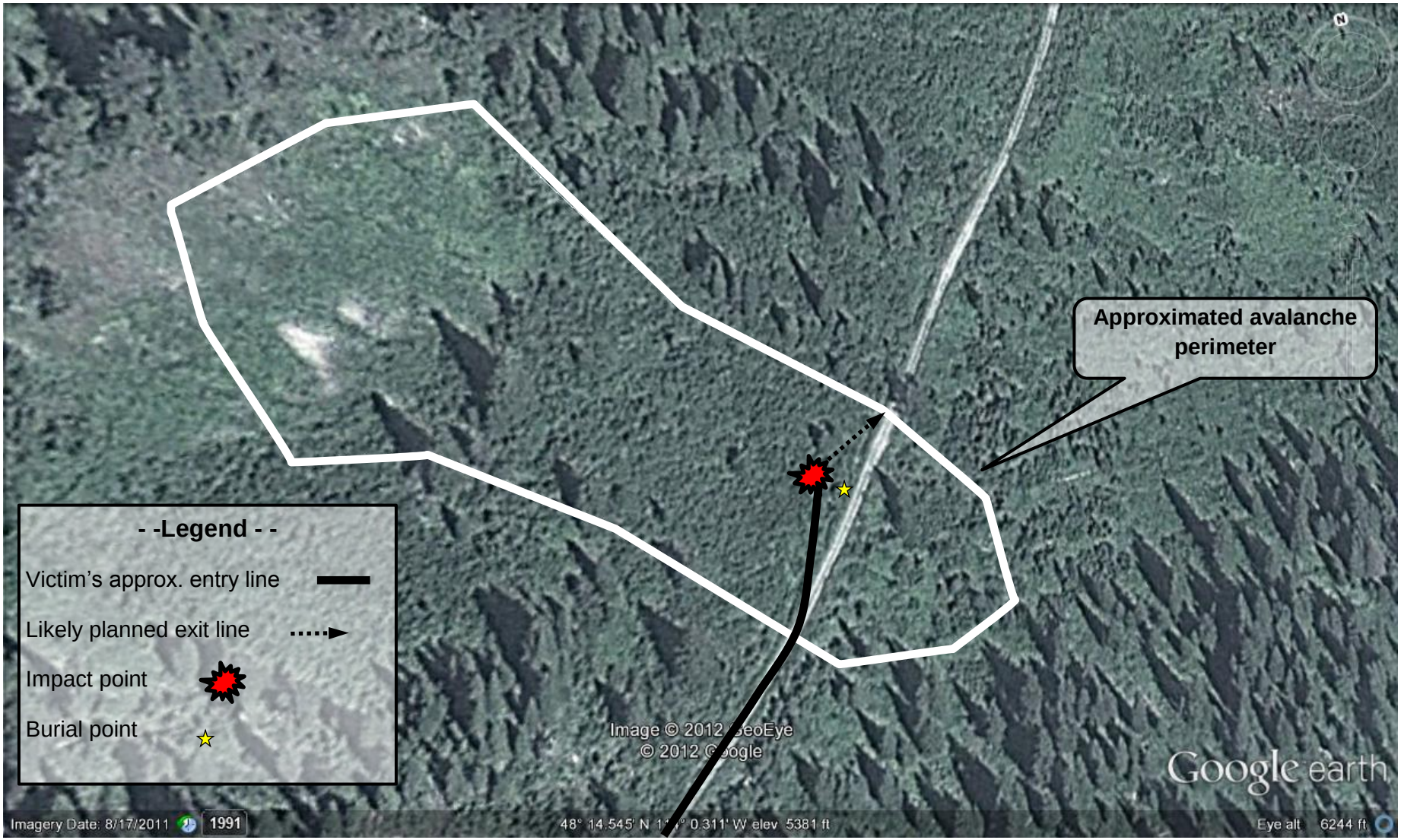


INCIDENT VICINITY MAP

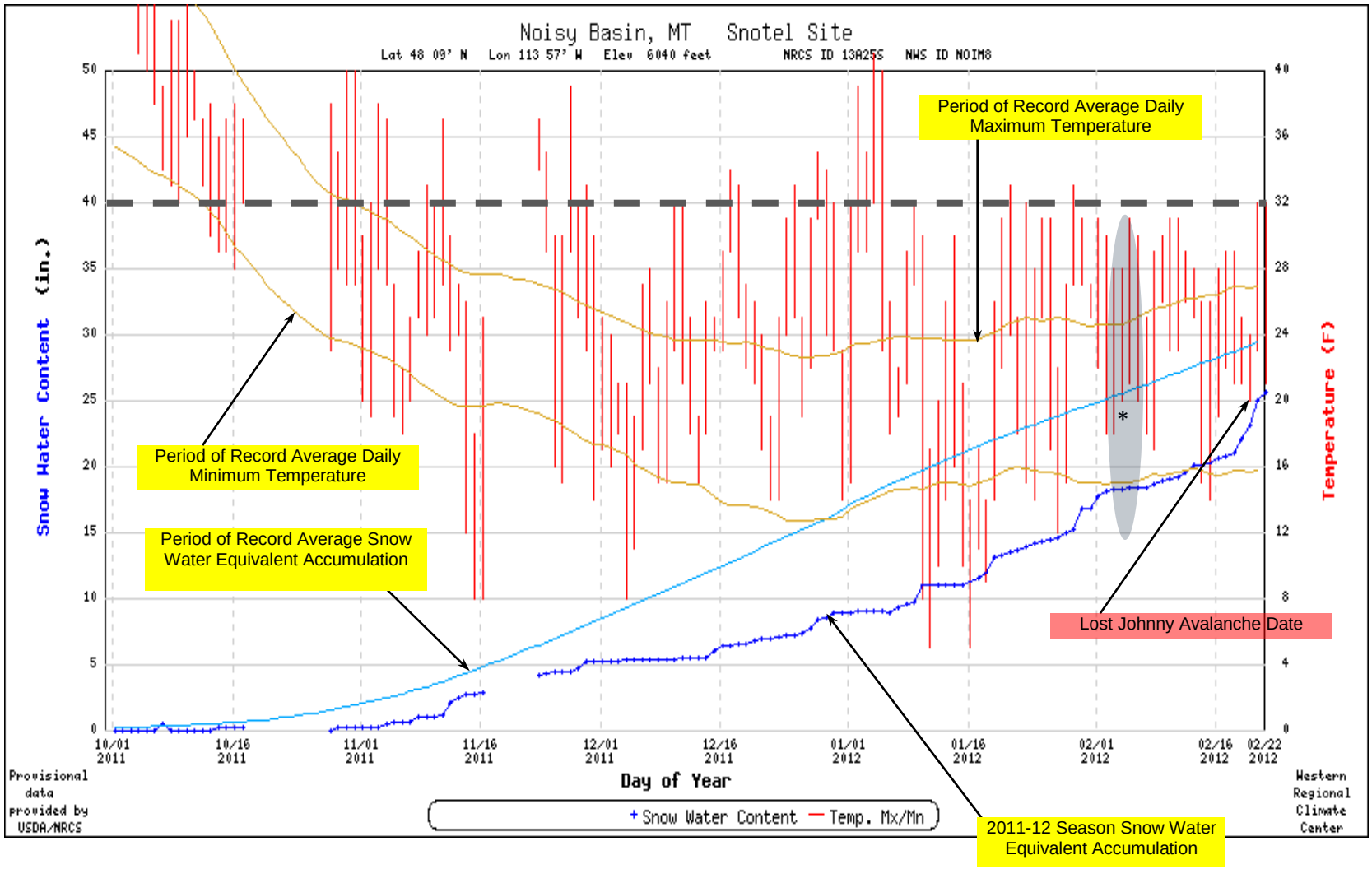
INCIDENT SITE MAP




End of Road, NFSR #895B,
Gas Hill access to Pinball Alley
Lost Johnny
Avalanche
- - LEGEND - -
Road sections impacted / covered with avalanche debris Tuesday morning, 2-21-12
Lost Johnny Creek
Road, NFSR #895B
Image © 2012 GeoEye
© 2012 Google
Google earth
Imagery Date: 8/17/2011
1991
48°15'16.50" N 114°00'10.84" W elev 5285 ft
Eye alt 17717 ft


Approximated avalanche perimeter
- -Legend - -
Victim's approx. entry line
Likely planned exit line
Impact point
Burial point
Image © 2012 GeoEye
© 2012 Google
Google earth
Imagery Date: 8/17/2011
1991
Eye alt 6244 ft

Appendix A-2 Weather

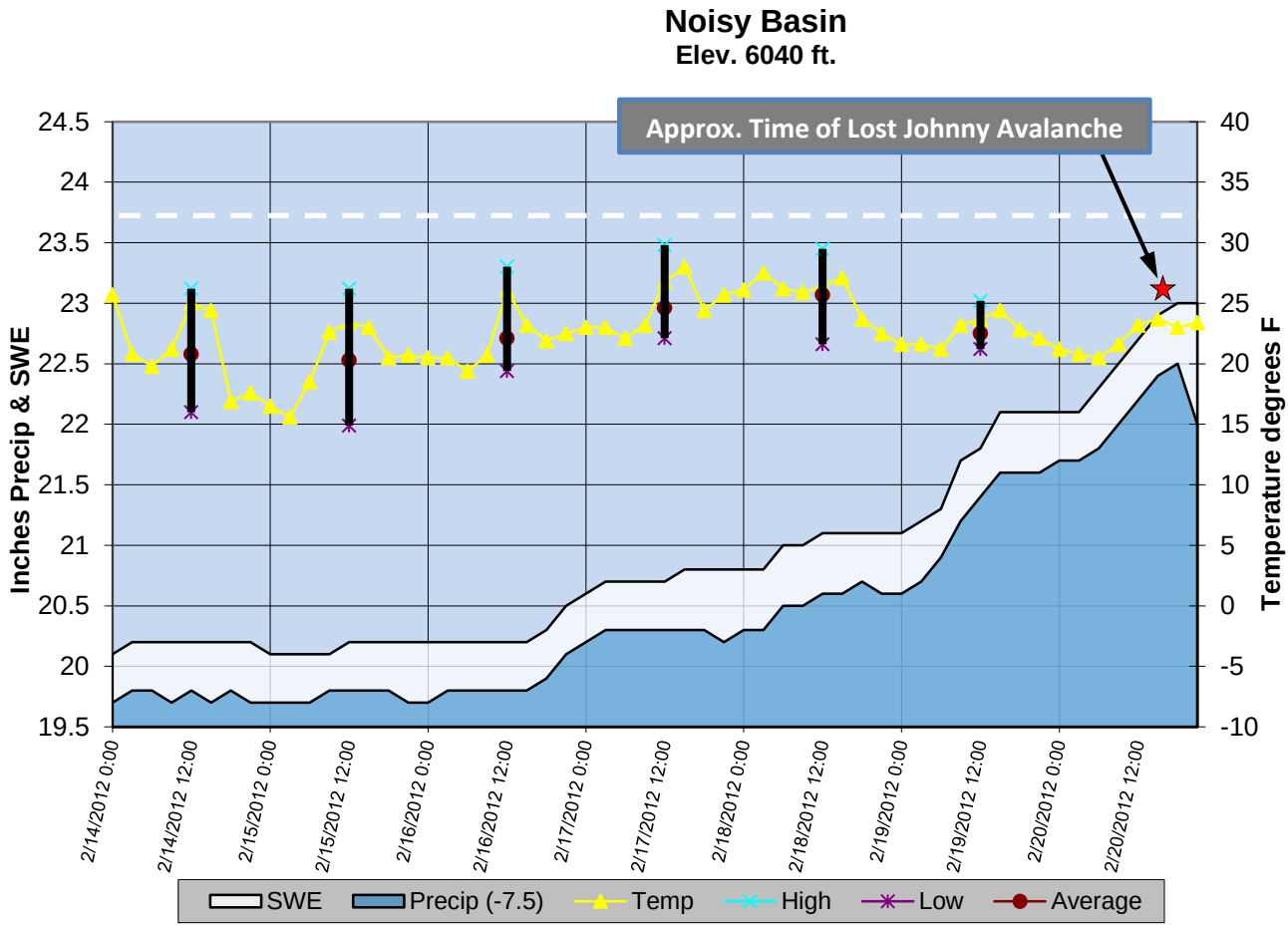


* Temperature Inversion & Period of Surface Hoar Formation

Noisy Basin Snotel - elev. 6040 ft.

Date	Snow Water Equivalent			Year-to-Date Precipitation		
	Current (in)	Average (in)	Pct of Avg	Current (in)	Average (in)	Pct of Avg
October 15, 2011	0.2	0.7	29*	5.7	1.5	380
November 1, 2011	0.3	3	10*	7	3.8	184
November 15, 2011	2.7	5.7	47	9.8	7	140
December 1, 2011	5.3	10.8	49	12.6	11.7	108
December 15, 2011	5.5	15	37	12.9	15.8	82
January 1, 2012	9.0	19.8	45	16.5	20.7	80
January 15, 2012	11.1	22.8	49	18.5	24.9	74
February 1, 2012	16.9	27	63	24.1	29.4	82
February 15, 2012	20.1	30.0	67	27.2	32.7	83
February 20, 2012	22.1	31.5	70	29.2	33.9	86

* = Analysis may not provide a valid measure of conditions.



Appendix A-3 Avalanche Advisory

US FOREST SERVICE NORTHWEST MONTANA
BACKCOUNTRY AVALANCHE ADVISORY

FOR THE GLACIER PARK AND FLATHEAD & KOOTENAI NATIONAL FOREST AREAS

Avalanche advisory does not apply to developed ski areas

Issue Date:	**6:00 AM, Friday, February 17, 2012**
Valid Until:	Midnight, Friday, February 17, 2012
Next Update:	Tuesday, February 21, 2012
Issued by:	Stan Bones

This advisory is a product of the US Forest Service, US Dept. of Agriculture. Along with other snow and avalanche information, it is originally posted at http://www.fs.usda.gov/flathead. An audio summary is available via telephone at 406-257-8402

All Mountain Ranges

7,500 ft. elevation

5,500 ft.

Avalanche Danger Summary

2 -Moderate : 5,500 to 7,500 ft. elevation on steep, open terrain

1 - Low : below 5,500

AVALANCHE – INSTABILITY DESCRIPTION

All Mountain Ranges - 5,500 to 7,500 ft. elevation

Danger Level	**2 - MODERATE**
Confidence	Good
Travel Advice	• Heightened avalanche conditions on steep, open slopes and gullies • Evaluate snow and terrain carefully
Likelihood of Avalanches	• Natural avalanche ***unlikely*** • Human triggered avalanches ***possible***
Avalanche Size & Distribution	• Small avalanches in specific areas or • Larger avalanches in isolated areas • **Concern is steep, open slopes and gullies lacking vegetative and terrain anchors, particularly slopes with a relatively thin snow cover and a basal layer of weakly bonded, eroding, faceted grains** • **Concern also with unstable near surface snow poorly bonded to buried surface hoar or layers of melt-freeze ice**

AVALANCHE – INSTABILITY DESCRIPTION

All Mountain Ranges - below 5,500 ft. elevation

Danger Level	1 - LOW
Confidence	Good
Travel Advice	• Generally safe avalanche conditions exist • Watch for unstable snow on isolated terrain features
Likelihood of Avalanches	• Both natural and human triggered avalanche ***unlikely***
Avalanche Size & Distribution	• Very small avalanches in widespread areas or • Small avalanche in isolated areas

Because of the general nature of this advisory message, each backcountry party will always need to make their own time and site specific avalanche hazard evaluations. This advisory best describes conditions at the time of its issuance. As time passes avalanche and snow conditions may change, sometimes quite rapidly. Elevation and geographic distinctions used are approximate and transition zones between hazards exist.

Recent Mountain Weather

Summary	• A general lull in mountain weather conditions
Precipitation	• Light snow almost daily over the mtns., ○ Heaviest in Mission, Swan, Flathead, Livingston, and Lewis Ranges on the Flathead 1.1- Inches total of snow water equivalent over the 5-day period, Sunday to Thursday ○ Kootenai mtns saw generally only trace amounts
Temperature	• Temperatures mostly mild • Sunday and Monday Mountain average daily temps in the high 20's°F • Tuesday to Thursday Mountain average daily temps cooled to the low 20's°F
Wind	• Winds have generally been light to absent

Field Observation Locations

Thursday, 2-16-12	• Caribou Saddle, Purcell Range, N of Libby • Diamond Peak area, Whitefish Range, N of Whitefish • Noisy Basin, N Swan Range, NE of Bigfork
Tuesday, 2-14-12	• Snowslip area of John Stevens Canyon, S'ern edge of Glacier Park, Hwy 2, west of Marias Pass

Observer Report Locations

	None received

Avalanches Observed	• Small, isolated loose snow slides and roller/sun balls at low and mid elevations

Instability Concern / Avalanche Problem	*Level of Concern*	Most★★★ Less★★ Least ★
New Storm or Near Surface Snow	★★	• N'erly & E'erly Aspects New snowfall has increased the loading upon the surface hoar layer developed during cold clear nights 10 days ago • S'erly & W'erly Aspects New snow deposited upon melt-freeze ice crusts and layers formed during times of solar warming • Shear tests are reactive on or beneath each of these layers
Wind Loading	★	• Recent winds have generally been calm to light with wind transport minimal • Be alert if winds do increase, for wind slabs forming upon the weak surface hoar layer currently shallowly buried
Recent or Persistent Buried Weak Layer	★★	• Concern with the buried surface hoar and melt-freeze ice crusts and layers o These continue to fail with little to moderate force in shear tests • Concern also remains with basal depth hoar found beneath shallow snow covers o Found along the East Front and near the Continental Divide o Also found further west on wind scoured slopes and areas like Jewel Basin where overall snowfall has been below normal
Spring Wet Snow or Melt-Freeze	★	• Not applicable currently with reestablished cloud cover • Can occur rapidly however with even short clearing following a new snowfall
Rain-on-Snow		Not applicable
Loose Snow	★	• Mild temperatures generally promoting surface snow consolidation
Other Concerns		

Weather Forecast	Current NWS Backcountry Forecast
Summary	• Moderate Pacific weather system forecasted to impact the region beginning Friday night and through the weekend
Precipitation	• Friday through Sunday o Light to moderate new accumulations of snow are expected o 1-4-inches of new depth each day o Heaviest snowfall on Saturday
Temperature	• Daytime temps remaining mild in the high 20's to mid 30's° F • Nighttime lows 15-25 ° F throughout the period
Wind	• Light and variable

Avalanche Outlook	
Trend	• Through the weekend we expect the avalanche danger to gradually increase with the new snowfall
Concern	• **Be particularly alert to new snow loading either from precipitation or wind upon the existing buried weak surface hoar and melt-freeze ice layers**
Comment	• ***Always carry and know how to use avalanche safety equipment*** • ***Watch for a possible rapid change in weather conditions beyond forecast amounts*** • ***Check out the site specific snow stability before jumping in or on potential avalanche slopes***

Appendix A-4 Photographs *(All photos by USFS, Flathead Nat'l Forest, Stan Bones)*

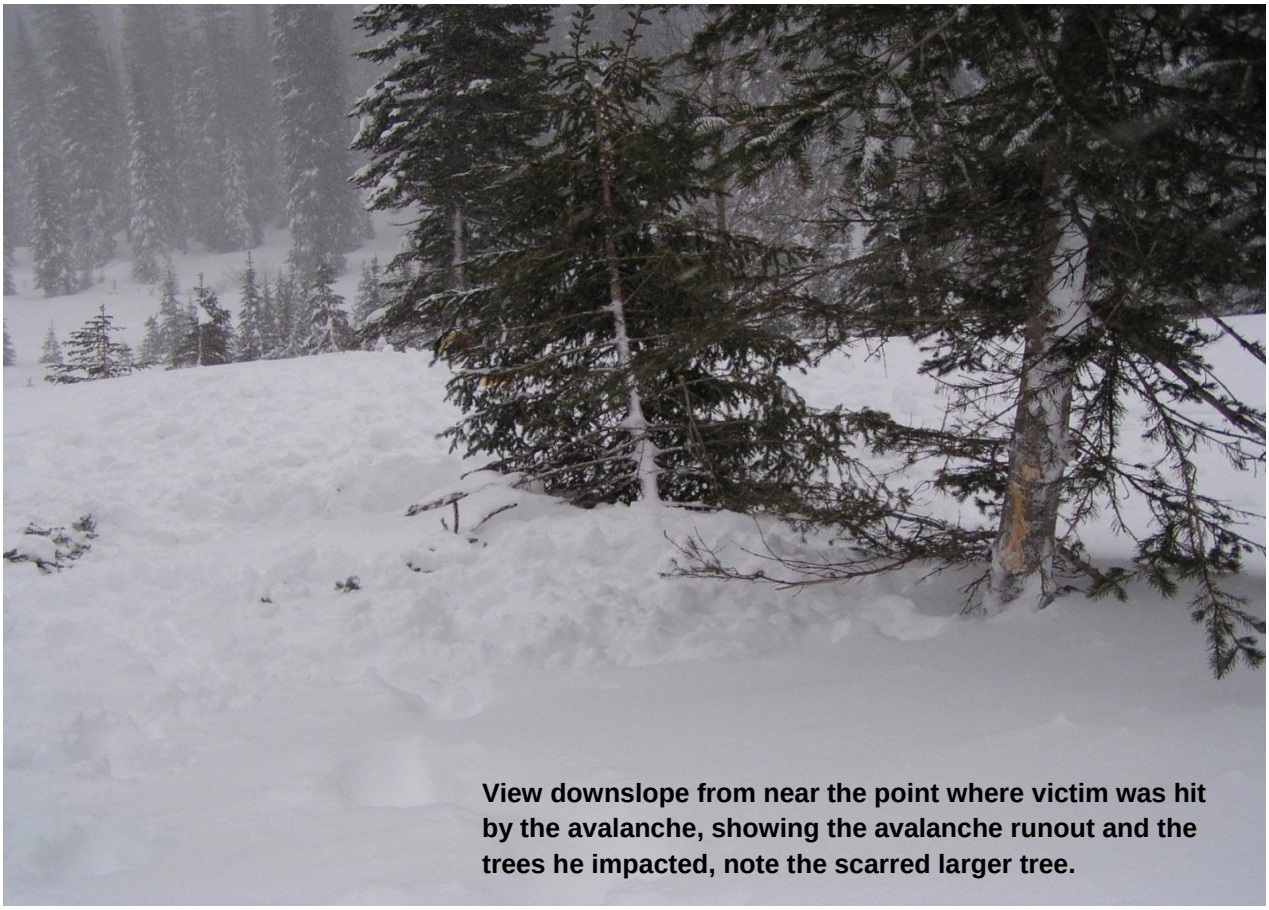
Up slope view from road near burial point, showing approx. avalanche crown and flanks – USFS photo

Burial point and upside down snowmobile as initially seen Tuesday morning, 2-21-12, following the Monday afternoon incident. - USFS Photo

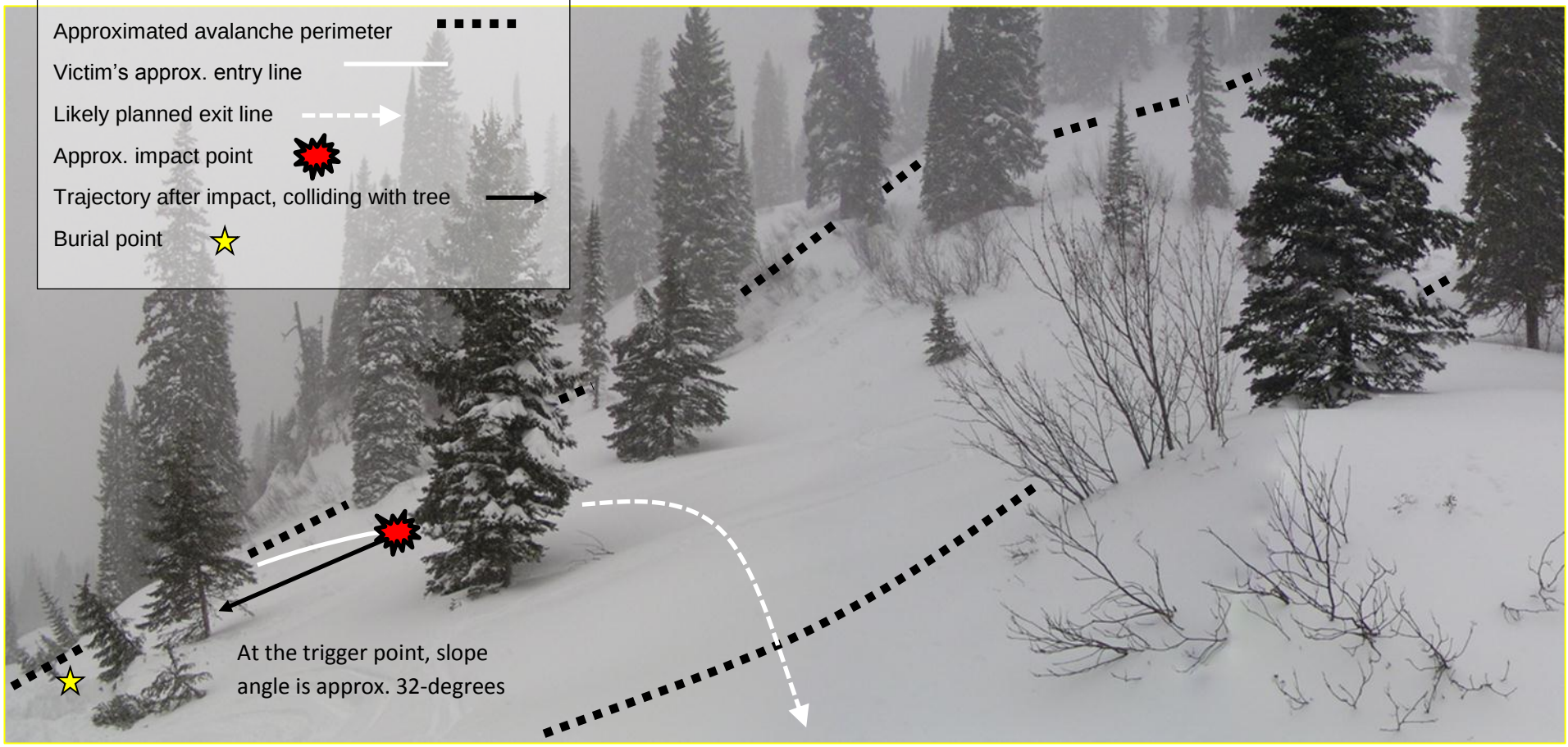
View upslope of burial point showing approx. avalanche right flank and crown. Forest Service personnel working to retrieve buried snowmobile. Victim impacted and was strained through trees immediately above burial point.

Freeing the entrapped snowmobile, Tuesday morning, 2-21-12

Working to upright the entrapped snowmobile



View downslope from near the point where victim was hit by the avalanche, showing the avalanche runout and the trees he impacted, note the scarred larger tree.


- - LEGEND - -
Approximated avalanche perimeter
Victim's approx. entry line
Likely planned exit line
Approx. impact point
Trajectory after impact, colliding with tree
Burial point
At the trigger point, slope
angle is approx. 32-degrees

Snow Profile

Reference: LOST JOHNNY AVALANCHE

Date: 2-21-12 Time: 1130 hrs Observers: T.Willits, J.Sather

Location: Lost Johnny Creek, Lat. 48°14'31.87" N, Long. 113°00'17.09" W

Elev: 5527 ft. Aspect: ESE Slope Angle: 35° Precip: _____ Sky: _____ Wind Dir: _____ Speed: G

Wind Loading? Y N PREV Ski Pen: _____ cm in Boot Pen: _____ cm in Profile Type: Fracture Profile